Magazine for several years, it is almost certain that the author referred to by W. X. was S. Y. S. Perhaps some reader may be able to give his name.

July 14, 1936. J. C. A.

XIII.—HORN GROWTH AS OBSERVED IN BLACK BUCK AND NILGAI.

(*With a photo*).

1. The very interesting note written by Mr. J. E. Hall of the Burma Shell Co., Ltd., Muzaffarpur, B. and O (*Journal* of the 15th of April, 1936, on 'Horn growth as observed in Black

Buck and Nilgai') has attracted my attention. I have had considerable experience of Black Buck, Chinkara and Nilgai, as the territory of the Malerkotla State abounds with these antelopes. Black Buck are found in herds of 300 or more and innumerable smaller herds are a common sight. I find by going through records of my shoots that I have shot three hundred of these graceful animals. Some really fine heads have been obtained from the State

preserves. A head of 29½ in. was shot in the winter of 1917, and another fine specimen of 27½ in., a royal spread, was shot by me in 1926, the photograph of which is published above.

Mr. J. E. Hall states that he found 'a new growth of horns displacing the older horn from underneath and growing in the usual way'. I have myself found a black buck which I shot only last year to have the outer horns loose and shaking so that the slightest force disjointed them from the presumably raw and new growth of horns to which the old ones were joined. The covering horns were also split at the base. On being dislocated the old covers left a base ½ in. high on which they rested. This ½ in. of horny substance no doubt conveyed the idea that in time it would cover up the inner horn thus giving the animal a new pair of horns.

I could not call this case a sound basis for expressing positively the fact that antelopes shed their horns as is the case with deer. While shed horns of sambur, chital and gond and other deer are commonly found, I believe that no case of shed horns of antelope being found has ever been recorded. It would be very interesting and useful indeed if more light could be thrown on this subject by other sportsmen and naturalists.

PUNJAB. IFTIKHAR ALI KHAN,
May 28, 1936. *Heir Apparent of Malerkotla State.*

HORN GROWTH IN THE NILGAI.

2. With reference to J. E. Hall's note under 'Miscellaneous Notes' item X in vol. xxxviii, No. 3. I confirm his observations regarding the shedding of the horns of the Nilgai.

I have a head of an old bull, length of horns 8 in., in which the old outer casing has commenced splitting away from the bottom or new growth and the outer horn is of a brownish colour with numerous fine cracks longitudinally along the entire length. The taxidermist who mounted the skull has trimmed the bottom split and frayed portions away all round up to where the old and new horns meet, but in spite of this it is observed that the outer casing is quite independent of the newly grown horn.

TANJORE. C. H. BIDDULPH.
September 4, 1936.

HORN GROWTH IN NILGAI.

3. Regarding Mr. J. E. Hall's note on the above, I may mention that I have noticed a similar case in a nilgai. This animal when shot had very blunt rounded horns; the skull was kept and after a time, as it dried, the upper sheath came off like a cap, from about an inch away from the base, revealing a new horn below with very sharp points.

CENTRAL MUSEUM, E. A. D'ABREU.
NAGPUR.
July 4, 1936.

[There are three processes by which horns are replaced. The replacement is most complete in the Deer in which the entire horn is shed periodically. In deer, this shedding is a twofold process. Firstly the 'velvet' which covers the new grown antler is stripped. The 'velvet' takes the place of the horny sheath which covers the bony cores of the horns of hollow horned ruminants. The 'velvet' is removed leaving a core of dead bone which we call the horn. Next the horn itself is shed. Thus in deer the process of horn replacement involves both the outer sheath (velvet) and the core (horn).

An intermediate or less complete process of horn replacement is seen in the Prong-horned Antelope (*Antilocapra americana*). The structure of the horns of these antelopes bears a closer resemblance to the *Bovidae* (hollow horned ruminants) than to the *Cervidae* (deer), but, like deer, these antelopes shed their horns annually. But replacement is not entire as in the deer—it is limited to the horny outer sheath, the bony cores which support the horns from within are not shed.

Finally there is a process of horn replacement which has been observed in some bovines and true antelopes. Buffon observed the process in the Ox (*Nat. Hist.* t. i, iv, p. 459) and Ogilby in the African oryxes, the Arabian oryx and the sing sing antelope (*Trans. Zool. Soc.*, vol. iii, p. 53). Ogilby likens this process of horn replacement to the replacement of the milk dentition by permanent teeth. After comparing the structure of young or juvenile horns to mature bovine horns, he says that the *permanent* horn is developed, and grows up within the horn of the young animal and, in its growth, carries the outer horn upwards and supports it like a sheath or scabbard. The early horn thus severed from the vessels which formerly supplied it with nutriment, dries up and bursts as a result of the expansion and growth of the permanent horn within it. Ultimately it exfoliates and comes off in large irregular strips leaving the permanent horn clean and bare. Ogilby says that as far as his observations enabled him to judge, this exfoliation takes place only once during the life of the animal, and that at the period of adolescence, immediately before the appearance of the first ring or annulus. Mr. Hall in his note on horn growth in Black Buck and Nilgai (*Journal*, xxxviii, 618) gives an example of a new horn growth displacing the older horn from within in an immature black buck. It is parallel to Ogilby's observation of the replacement of the juvenile horns by permanent horns in the Oryx and other antelopes. Ogilby however indicated that his observations as far as they went led him to conclude that replacement of horns was limited to the period of adolescence. Mr. Hall in his note (*loc. cit.*) however indicates a similar process taking place in the case of an adult nilgai and Mr. C. Biddulph and E. A. D'Abreu confirm Mr. Hall's observation in regard to this species. The whole question raises an interesting point for observation and study by readers of the *Journal* who may have the opportunity of confirming Mr. Hall's observations on the growth of horns in the nilgai and black buck.—Eds.]